



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

with great accuracy. The solar spectrum was impressed upon the plate immediately after the end of the total eclipse, for reference. No trace of the coronal line exists on the plate, undoubtedly because of the strong absorption of the prisms.

TABLES OF THE ELEMENTS OF COMET-ORBITS,
JANUARY, 1896, TO DECEMBER, 1907.

BY J. C. DUNCAN.

The following tables have been prepared at the suggestion of Director CAMPBELL, to supplement those compiled by W. C. WINLOCK, and published in *Publications* of the A. S. P., Vol. VIII, p. 141. Professor WINLOCK's tables include all the comets whose orbits were known and which reached perihelion before January 1, 1896; the tables here presented complete the list up to the present time.

The data were derived from the various astronomical periodicals, chiefly from the *Astronomische Nachrichten* and the *Astronomical Journal*. In each case that set of elements was chosen which most nearly represented the path of the comet.

Table I gives the elements of comets in order of perihelion passage. The numbers in the first column are continued from those of WINLOCK, which are identical with the numbers in Dr. GALLE's catalogue of comet-orbits. The second column contains the designation of the comet according to the order of its discovery; in the case of well-known periodic comets this is followed by an abbreviation of the name of the comet's discoverer. These abbreviations are as follows:—

d'A = D'ARREST	HO = HOLMES
Bk = BROOKS	T ₂ = TEMPEL (second comet)
E = ENCKE	TU = TUTTLE
F = FAYÉ	W = WINNECKE
Fi = FINLAY	WO = WOLF

The third and following columns give the orbital elements, as follows:—

T = time of perihelion passage, expressed in Greenwich mean time.

ω = the argument of perihelion, or the "longitude" of perihelion minus the longitude of ascending node.

Ω = longitude of ascending node.

i = inclination of orbit to ecliptic (when $i > 90^\circ$ the motion is retrograde).

q = perihelion distance, in astronomical units.

a = semi-major axis of the orbit, in astronomical units.

U = period of revolution about the Sun, in years.

e = eccentricity of the orbit.

The eleventh column gives the names of the discoverers of new comets, and the last column contains remarks pertaining to the comets or their orbits.

In order to facilitate the comparison of the orbits of newly discovered comets with those already known, the comets given in Table I are rearranged in Tables II to V, in the order of magnitude of their various elements. Each comet is there indicated by the number applied to it in Table I, or, in the case of the periodic comets, by the abbreviation of the discoverer's name.

In these *Publications*, Vol. XIV, p. 49, Professor HUSSEY extended WINLOCK's Table I to January, 1902; but as he did not extend the other tables, the elements of those comets are reprinted here. HUSSEY's values of the elements do not differ materially from mine.

Since this list contains few periodic comets not given in WINLOCK's list, no classification was made in the order of a , U , or e .

TABLE I.—COMETS ARRANGED IN ORDER OF T .

No.	Designation.	T	ω	Ω	i	q	a	U	e	Discoverer.	Remarks.
420	<i>a</i> 1896	1896, Jan.	31.8	358.5	208.9	155.8	0.588			PERRINE.	
421	<i>b</i> 95 F	1896, Mar.	19.3	201.2	209.8	11.3	1.738	y	0.549		
422	<i>b</i> 96	1896, Apr.	17.6	1.7	178.3	55.6	0.566	7.57		SWIFT.	
423	<i>e</i> 96	1896, July	10.9	41.0	151.0	88.4	1.142			SPERRA.	
424	<i>d</i> 96	1896, Oct.	26.0	139.5	192.1	11.6	1.482	9.00	0.657	GIACOBINI.	
425	<i>c</i> 1896 Bk	1896, Nov.	4.2	343.8	18.0	6.1	1.959				1889 V.
426	<i>g</i> 96	1896, Nov.	24.6	163.9	246.6	13.6	1.110	7.07	0.470	PERRINE.	
427	<i>f</i> 96	1897, Feb.	8.1	172.4	86.3	146.1	1.062	6.67	0.677	PERRINE.	
428	<i>a</i> 97 d'A	1897, May	23.9	173.1	146.4	15.7	1.321	6.69	0.627	PERRINE.	
429	<i>b</i> 97	1897, Dec.	8.6	65.8	32.0	69.6	1.357			PERRINE.	
430	<i>b</i> 1898	1898, Mar.	17.4	145.1	262.5	72.4	1.098			PERRINE.	
431	<i>a</i> 98 W	1898, Mar.	20.4	173.4	100.9	17.0	0.924	5.82	0.415		
432	<i>d</i> 98 E	1898, May	27.8	184.0	334.8	12.9	0.341	2.22	0.846		
433	<i>f</i> 98 W ₀	1898, July	4.6	172.9	206.4	25.2	1.604	3.285		GIACOBINI.	
434	<i>g</i> 98	1898, July	25.5	22.4	278.3	166.8	1.501	6.82	0.555		
435	<i>e</i> 1898	1898, Aug.	16.2	205.6	259.1	70.0	0.626			PERRINE.	
436	<i>c</i> 98	1898, Sept.	14.0	233.3	74.0	69.9	1.702			CODDINGTON.	
437	<i>j</i> 98	1898, Sept.	20.2	4.6	95.8	22.5	2.269			CHASE.	
438	<i>h</i> 98	1898, Oct.	20.5	162.4	34.9	28.8	0.420			PERRINE.	
439	<i>i</i> 98	1898, Nov.	23.2	123.6	96.3	140.4	0.756			BROOKS.	
440	<i>a</i> 1899	1899, Apr.	13.0	8.7	25.0	146.2	0.327		1.0004	SWIFT.	Hyperbolic.
441	<i>d</i> 99 Ho	1899, Apr.	28.1	14.1	331.7	20.8	2.129	6.88	0.411		
442	<i>b</i> 99 Tu	1899, May	14.1	206.8	269.7	54.3	1.024	13.76	0.822		
443	<i>c</i> 99 T ₂	1899, July	28.5	185.1	121.2	12.7	1.351	5.218	0.551	GIACOBINI.	
444	<i>e</i> 99	1899, Sept.	15.0	10.9	272.2	76.9	1.786				
445	<i>a</i> 1900	1900, Apr.	28.2	23.1	40.1	146.6	1.346			GIACOBINI.	
446	<i>b</i> 00	1900, Aug.	3.2	12.4	328.0	62.5	1.015			BORRELLY-BROOKS.	
447	<i>c</i> 00	1900, Dec.	1.4	175.9	192.6	31.0	0.977			GIACOBINI.	
448	<i>a</i> 01	1901, Apr.	24.3	203.0	109.8	131.0	0.244			HOLK.	Quite bright.
449	<i>b</i> 01 E	1901, Sept.	15.4	184.0	334.8	12.9	0.341	3.285	0.846		

450	a 1902	1902, May	228.4	52.2	66.5	0.451	BROOKS.	{ Observed by Grigg only. Orbit very uncertain. Bright.
451	c 02	1902, June 20.	202.7	217.8	18.4	0.530	GRIGG.	
452	b 02	1902, Nov. 23.9	152.9	49.3	156.3	0.401	PERLINE.	
453	a 03	1903, Mar. 16.0	133.7	2.3	30.9	0.411	GIACOBINI.	
454	d 02	1903, Mar. 23.9	6.0	117.5	43.9	2.770	GIACOBINI.	
455	b 1903	1903, Mar. 25.4	185.0	213.1	66.5	0.499	GRIGG.	Quite bright. 1889 V.
456	c 03	1903, Aug. 27.6	127.4	203.5	85.0	0.329	BORRELLY.	
457	d 03 Bk	1903, Dec. 11.	343.8	18.1	6.1	1.959		
458	a 04	1904, Mar. 7.1	53.5	275.8	125.1	2.707	BROOKS.	
459	d 04	1904, Nov. 4.2	41.3	218.5	99.7	1.885	GIACOBINI.	
460	c 1904 T ₂	1904, Nov. 10.3	185.7	121.0	12.6	1.201		
461	b 04 E	1905, Jan. 11.6	184.0	334.8	12.9	0.341		
462	e 04	1905, Jan. 16.5	352.2	766	30.6	1.399	BORRELLY.	
463	a 05	1905, Apr. 4.1	358.2	157.5	40.2	1.114	GIACOBINI.	
464	b 06	1905, Oct. 20.8	159.1	342.2	4.2	3.316	KOFFR.	Orbit indeterminate.
465	b 1905	1905, Oct. 25.7	132.7	222.9	140.6	1.052	SCHAEER.	
466	a 06	1905, Dec. 22.2	89.7	286.4	126.5	1.295	BROOKS.	Bright. Few observations.
467	c 05	1906, Jan. 22.4	190.3	92.1	43.7	0.215	GIACOBINI.	
468	c 06	1906, Feb. 21.5	278.7	72.8	81.4	0.743	ROSS.	
469	f 06 Ho	1906, Mar. 14.2	14.3	331.5	20.8	2.122		
470	e 1906	1906, May 2.1	19.5	263.8	8.7	1.699	KOFFR.	
471	d 06 Fi	1906, Sept. 7.3	315.8	52.4	3.1	0.998		
472	h 06	1906, Oct. 16.4	205.1	103.2	14.1	1.630	METCALF.	
473	g 06	1906, Nov. 21.1	8.6	84.9	56.5	1.215	THIELE.	
474	a 07	1907, Mar. 19.2	317.2	97.2	141.7	2.052	GIACOBINI.	
475	b 1907	1907, Mar. 27.6	328.8	189.1	110.2	0.924	MELLISH-GRIGG.	Preliminary elements.
476	c 07	1907, May 31.2	39.6	160.9	14.8	1.237	GIACOBINI.	
477	d 07	1907, Sept. 4.0	294.4	143.0	9.0	0.512	DANIEL.	Very bright.
478	e 07	1907, Sept. 14.5	294.5	54.6	119.7	0.984	MELLISH.	

TABLE II—COMETS ARRANGED IN ORDER OF ω .

ω		Numbers.	ω		Numbers.
0° to 10°		422, 437, 454, 473, 440	180° to 190°		E, T ₂ , 455
10 20		444, 446, Ho, 470	190 200		467
20 30		434, 445	200 210		F, 448, 472, 435, Tu
30 40		476	210 220		
40 50		423, 459	220 230		450
50 60		458	230 240		436
60 70		429	240 250		
70 80			250 260		
80 90		466	260 270		
90 100			270 280		468
100 110			280 290		
110 120			290 300		451, 477, 478
120 130		439, 456	300 310		
130 140		465, 453, 424	310 320		Fi, 472, 474
140 150		430	320 330		475
150 160		452, 464	330 340		
160 170		438, 426	340 350		Bk
170 to 180		427, Wo, d'A, W, 447	350 to 360		462, 463, 420

TABLE III—COMETS ARRANGED IN ORDER OF Ω .

Ω		Numbers.	Ω		Numbers.
0° to 10°		453	180° to 190°		475
10 20		Bk	190 200		424, 447, 472
20 30		440	200 210		420, F, Wo
30 40		429, 438	210 220		451, 455, 459
40 50		445, 452	220 230		465
50 60		450, Fi, 478	230 240		
60 70			240 250		426
70 80		468, 436, 462	250 260		435
80 90		473, 427	260 270		Tu, 430, 470
90 100		437, 439, 467, 474	270 280		434, 444, 458
100 110		W, 448	280 290		466
110 120		454	290 300		456
120 130		T ₂	300 310		
130 140			310 320		
140 150		477, d'A	320 330		446
150 160		423, 463	330 340		432, Ho, E
160 170		476	340 350		464
170 to 180		422	350 to 360		

TABLE IV—COMETS ARRANGED IN ORDER OF *i*.

<i>i</i>	Numbers.	<i>i</i>	Numbers.
0° to 10°	Bk, 464, 470, Fi, 477	90° to 100°	459
10 20	F, 424, 426, d'A, W, E, T ₂ , 451, 472, 476	100 110	
20 30	Wo, 437, 438, Ho	110 120	475, 478
30 40	447, 453, 462	120 130	458, 466
40 50	454, 463, 467	130 140	448
50 60	422, Tu, 473	140 150	427, 439, 440, 445, 465, 474
60 70	429, 436, 446, 450, 455	150 160	420, 452
70 80	430, 435, 444	160 170	434
80 to 90	423, 456, 468	170 to 180	

TABLE V—COMETS ARRANGED IN ORDER OF *q*.

<i>q</i>	Numbers.	<i>q</i>	Numbers.
0.0 to 0.2		1.4 to 1.6	424, 434
0.2 0.4	E, 440, 448, 456, 467	1.6 1.8	F, Wo, 436, 444, 470, 472
0.4 0.6	420, 422, 438, 450, 451, 452, 453, 455, 477	1.8 2.0	Bk, 459
0.6 0.8	435, 439, 468	2.0 2.5	437, Ho, 474
0.8 1.0	W, 447, Fi, 475, 478	2.5 3.0	454, 458
1.0 1.1	427, 430, Tu, 446, 465	3.0 4.0	464
1.1 1.2	423, 426, 463	> 4.0	
1.2 1.3	T ₂ , 466, 473, 476		
1.3 to 1.4	d'A, 429, T ₂ , 445, 462		